

REMARKS

Claims 1-25 are pending in the application. The Examiner noted that the listing of references in the specification did not constitute a proper Information Disclosure Statement (IDS), and therefore only those references cited by the Examiner on form PTO-892 have been considered. The Examiner found the drawings acceptable subject to the correction of informalities. Claims 1-5, 9-13, and 17-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. Claims 6-8 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno in view of Johnson, Jr. in further view of Hamano. Claims 1, 10, 18, 23 and 25 have been amended, without new matter. Reexamination and reconsideration of the application in view of the amendments and the following remarks is requested.

The present invention is directed to an optical element within an objective lens for use with an electronic camera that modifies the light passing through the lens to a predetermined spectrum of light rays. The optical element is located along the optical axis of the lens at a location where the light rays are substantially collimated and perpendicular to the surface of the optical element regardless of the positions of the lens groups in the lens. A coating on the surface of the optical element acts as an interference filter and produces the predetermined spectrum of light rays. Preferably, the optical element is of zero optical power for minimizing the optical effect of the element, and is replaceable with comparable optical elements having different coatings or no coating for altering the predetermined spectrum.

The Examiner noted that the listing of references in the specification did not constitute a proper Information Disclosure Statement (IDS), and therefore only those references cited by the Examiner on form PTO-892 have been considered. The Applicant thanks the Examiner for bringing the unintentional defect in disclosure to his attention. The Applicant further notes that only Johnson, Jr. was listed in the specification, and that Johnson, Jr. was listed on form PTO-892. Therefore, any defects in disclosure have been mitigated by the Examiner's consideration of Johnson, Jr.

The Examiner found the drawings acceptable subject to the correction of informalities, particularly illegible reference numbers and lines. The Applicant has submitted new formal drawings herewith, with clearly identified reference numbers and lines, and therefore it is respectfully submitted that the objection to the drawings has been overcome.

Claims 1-5, 9-13, and 17-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. With the amendments to claims 1, 10, 18, 23 and 25, it is respectfully submitted that this rejection has been overcome.

Konno contains no disclosure at all related to an interference filter for producing a predetermined spectrum of light, and fails to disclose locating the filter in an area of the lens where the light rays will be substantially collimated and perpendicular to a surface of the filter. In addition, because Konno does not discuss the movement of lens groups within a lens, such as during focusing or zooming, Konno also fails to disclose locating the filter in areas where light rays will be substantially collimated and perpendicular to the surface of the filter regardless of the position of the lens groups. Instead, Konno discloses a low-pass filter for avoiding spurious color and moire fringes caused by the relation between the number of pixels of an image sensor and the spatial frequency of an object, and also discloses an infrared-cutting filter for cutting off infrared components. Konno also illustrates the placement of the low-pass filter between the last element in the lens (or extender) and the image sensor 6 (see, e.g., FIG. 1 and 4) in an area in which light rays are not substantially collimated and perpendicular to the surface of the filter but are converging on the image sensor.

Johnson, Jr. is also silent as to locating a filter in an area of the lens where the light rays are substantially collimated and perpendicular to a surface of the filter regardless of the position of the lens groups. Johnson, Jr. discloses an interference filter for producing a predetermined spectrum of light, but only discloses the filter, and says nothing about where the filter may be located. Johnson, Jr. contains no disclosure at all related to a lens, where the filter might be located in the lens, or the movement of lens groups within a lens, such as during focusing or zooming. In addition, Johnson, Jr. only considers a single beam of light, not multiple

beams of light, and thus does not discuss multiple light rays that are substantially collimated and perpendicular to a surface of the filter for multiple light beams.

Claim 1, as amended, recites the limitation: "an optical element on an optical axis of the lens and having a surface at a location selected along the optical axis such that the optical element will receive light rays substantially collimated and perpendicular to said surface regardless of an orientation of the one or more lens groups." In particular, claim 1 was amended to more clearly recite that the location of the optical element is chosen such that the optical element will receive light rays substantially collimated (see FIG. 1 and page 8, line 20-22 of the specification) and perpendicular to the surface of the optical element (see FIG. 1 and page 9, lines 4-9 of the specification) regardless of the orientation of the one or more lens groups (see FIG. 1 and page 9, lines 15-16 of the specification). As demonstrated by the aforementioned parenthetical references to the specification, no new matter has been added. Note that FIG. 3 illustrates a different placement of the optical element in which the optical element will also receive light rays substantially collimated and perpendicular to the surface of the optical element regardless of the orientation of the one or more lens groups. In FIG. 3, as zoom lens group Z moves with respect to relay lens group R (which includes optical element 16'), the ray angles entering optical element 16' will change. Nevertheless, the location of optical element 16' is chosen such that the maximum ray angle over the full range of movement is still "substantially perpendicular." (see page 10, lines 14-17 of the specification).

As discussed above, neither Konno nor Johnson, Jr. disclose, teach or suggest the limitation of amended claim 1 recited above. Furthermore, even if it is assumed that having light rays substantially perpendicular to the surface of a filter is preferred because it increases transmittance is well known in the art, as the Examiner states, that knowledge in combination with the teachings in Konno and Johnson, Jr. do not disclose, teach or suggest the present invention as recited in amended claim 1. Lenses with movable lens groups for focusing or zooming are much more complicated than fixed lenses because they create varying ray angles as the lens groups are moved, and it is not at all obvious to locate an optical element in a lens with

movable lens groups such that the optical element will receive light rays substantially perpendicular to its surface regardless of the orientation of the lens groups.

Because of the above, it is respectfully submitted that the rejection of amended claim 1 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome. In addition, because claims 2-5 and 9 depend from amended claim 1, the rejection of claims 2-5 and 9 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome for the same reasons provided above with respect to amended claim 1.

Claim 10, as amended, recites the limitation: "an optically flat optical element on and perpendicular to an optical axis of the lens at a location selected along the optical axis such that the optical element will receive substantially collimated light rays substantially perpendicular to the optical element regardless of an orientation of the one or more lens groups." In particular, claim 10 was amended to more clearly recite that the location of the optical element is chosen such that the optical element will receive light rays substantially collimated and perpendicular to the surface of the optical element regardless of the orientation of the one or more lens groups. As discussed above, neither Konno nor Johnson, Jr. disclose, teach or suggest this limitation. Furthermore, even if it is assumed that having light rays substantially perpendicular to the surface of a filter is preferred because it increases transmittance is well known in the art, as the Examiner states, that knowledge in combination with the teachings in Konno and Johnson, Jr. do not disclose, teach or suggest the present invention.

Because of the above, it is respectfully submitted that the rejection of amended claim 10 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome. In addition, because claims 11-13 and 17 depend from amended claim 10, the rejection of claims 11-13 and 17 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome for the same reasons provided above with respect to amended claim 10.

Claim 18, as amended, recites the limitation: "providing the camera with an objective lens having one or more lens groups and having an optical element surface within the objective lens at a location where the light rays are substantially collimated and perpendicular to the optical element surface regardless of an orientation of the one or more lens groups." In particular, claim 18 was amended to more clearly recite that the location of the optical element is chosen such that the optical element will receive light rays substantially collimated and perpendicular to the surface of the optical element regardless of the orientation of the one or more lens groups. As discussed above, neither Konno nor Johnson, Jr. disclose, teach or suggest this limitation. Furthermore, even if it is assumed that having light rays substantially perpendicular to the surface of a filter is preferred because it increases transmittance is well known in the art, as the Examiner states, that knowledge in combination with the teachings in Konno and Johnson, Jr. do not disclose, teach or suggest the present invention.

Because of the above, it is respectfully submitted that the rejection of amended claim 18 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome. In addition, because claims 19-22 depend from amended claim 18, the rejection of claims 19-22 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome for the same reasons provided above with respect to amended claim 18.

Claim 23, as amended, recites the limitation: "providing the camera with an objective lens having one or more lens groups and having an optical element within the objective lens at a location of substantially collimated light rays substantially perpendicular to the optical element regardless of an orientation of the one or more lens groups." In particular, claim 23 was amended to more clearly recite that the location of the optical element is chosen such that the optical element will receive light rays substantially collimated and perpendicular to the surface of the optical element regardless of the orientation of the one or more lens groups. As discussed above, neither Konno nor Johnson, Jr. disclose, teach or suggest this limitation. Furthermore, even if it is assumed that having light rays substantially perpendicular to the surface of a filter is preferred because it increases transmittance is well known in the art, as the Examiner states, that

knowledge in combination with the teachings in Konno and Johnson, Jr. do not disclose, teach or suggest the present invention.

Because of the above, it is respectfully submitted that the rejection of amended claim 23 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome. In addition, because claim 24 depends from amended claim 23, the rejection of claim 24 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome for the same reasons provided above with respect to amended claim 23.

Claim 25, as amended, recites the limitation: "an optical element within the objective lens at a location of substantially collimated light rays substantially perpendicular to the optical element regardless of an orientation of the one or more lens groups." In particular, claim 25 was amended to more clearly recite that the location of the optical element is chosen such that the optical element will receive light rays substantially collimated and perpendicular to the surface of the optical element regardless of the orientation of the one or more lens groups. As discussed above, neither Konno nor Johnson, Jr. disclose, teach or suggest this limitation. Furthermore, even if it is assumed that having light rays substantially perpendicular to the surface of a filter is preferred because it increases transmittance is well known in the art, as the Examiner states, that knowledge in combination with the teachings in Konno and Johnson, Jr. do not disclose, teach or suggest the present invention.

Because of the above, it is respectfully submitted that the rejection of amended claim 25 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. has been overcome.

Claims 6-8 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Konno in view of Johnson, Jr. in further view of Hamano. With the amendments to claims 1 and 10, and because claims 6-8 depend from amended claim 1 and claims 14-16 depend from amended claim 10, it is respectfully submitted that this rejection has been overcome.

Hamano contains no disclosure at all related to an interference filter for producing a predetermined spectrum of light, and fails to disclose locating the filter in an area of the lens where the light rays will be substantially collimated and perpendicular to a surface of the filter regardless of the position of the lens groups. Instead, Hamano discloses a low-pass filter with a diffraction grating for limiting image information of predetermined spatial frequency components. Hamano also describes a preferred placement of the low-pass filter closer to the aperture diaphragm of the image plane than to the magnification section to minimize the change to the image separation width during zooming. Thus, Hamano is concerned not with the angle of light rays entering the low-pass filter, but rather light rays leaving the low-pass filter.

Hamano does not make up for the deficiencies of Konno and Johnson, Jr. with respect to amended claim 1, because none of these references discloses "an optical element on an optical axis of the lens and having a surface at a location selected along the optical axis such that the optical element will receive light rays substantially collimated and perpendicular to said surface regardless of an orientation of the one or more lens groups," as recited in amended claim 1. Because claims 6-8 depend from amended claim 1, the rejection of claims 6-8 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. in further view of Hamano has been overcome.

Hamano also does not make up for the deficiencies of Konno and Johnson, Jr. with respect to amended claim 10, because none of these references discloses "an optically flat optical element on and perpendicular to an optical axis of the lens at a location selected along the optical axis such that the optical element will receive substantially collimated light rays substantially perpendicular to the optical element regardless of an orientation of the one or more lens groups," as recited in amended claim 10. Because claims 14-16 depend from amended claim 10, the rejection of claims 14-16 under 35 U.S.C. §103(a) as being unpatentable over Konno et al. in view of Johnson, Jr. in further view of Hamano has been overcome.

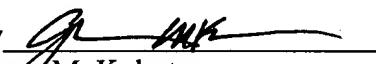
In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. According, the Examiner is respectfully requested to pass this application to issue.

If, for any reason, the Examiner finds the application other than in condition for allowance, Applicants request that the Examiner contact the undersigned attorney at the Los Angeles telephone number (213) 892-5752 to discuss any steps necessary to place the application in condition for allowance.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 490962001000.

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Respectfully submitted,

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